HT32F125x Development Board
User Manual

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1 Introduction

The HT32F125x development board is designed for the HT32F125x series of microcontrollers. The HT32F125x series of microcontrollers contain a variety of peripheral functions such as high speed SAR A/D Converter, Operational Amplifiers, I²C interface, USART interface, SPI interface, Timer Modules, Watchdog Timer, Real Time Clock, Serial Wire Debug Interface etc..

The development board is provided with some specific components to assist with device peripheral function operation such as RS232 connector, USB1.1 device controller, EEPROM, potentiometer and so on.

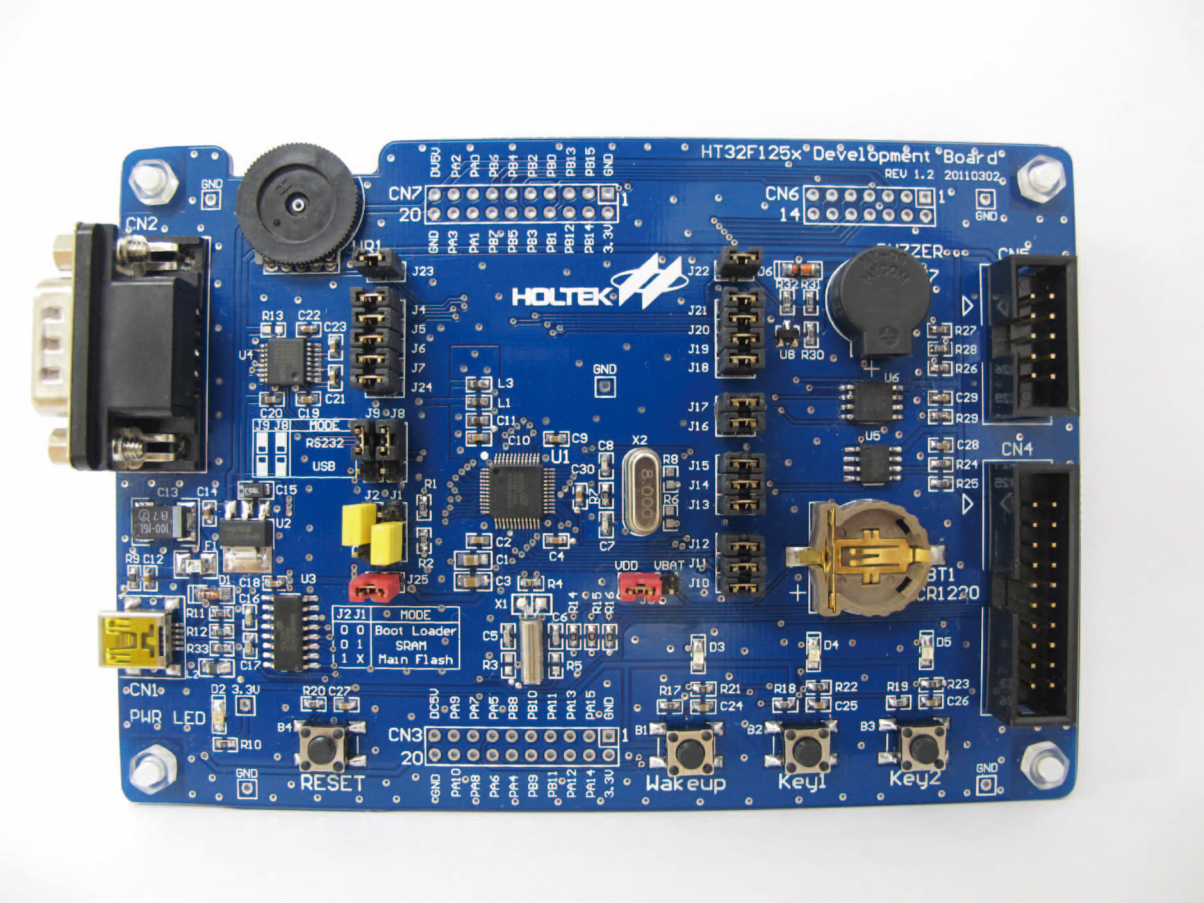


Figure 1. HT32F125x Development Board

Features

- USB1.1 full speed connection – uses HT45B0K
- 5V power supply: mini USB connector
- RS232 connector
- Reset, wakeup and two key buttons
- Three LEDs
- I^2C-compatible serial interface EEPROM
- SPI-compatible serial interface Flash
- SPI and I^2C extended interfaces for LCD display application
- PWM output for Buzzer driving
- Backup battery
- Boot from Flash, SRAM or boot loader
- SWD-10P and SWD-20P serial-wire debug port interface

2 Hardware Placement and Layout

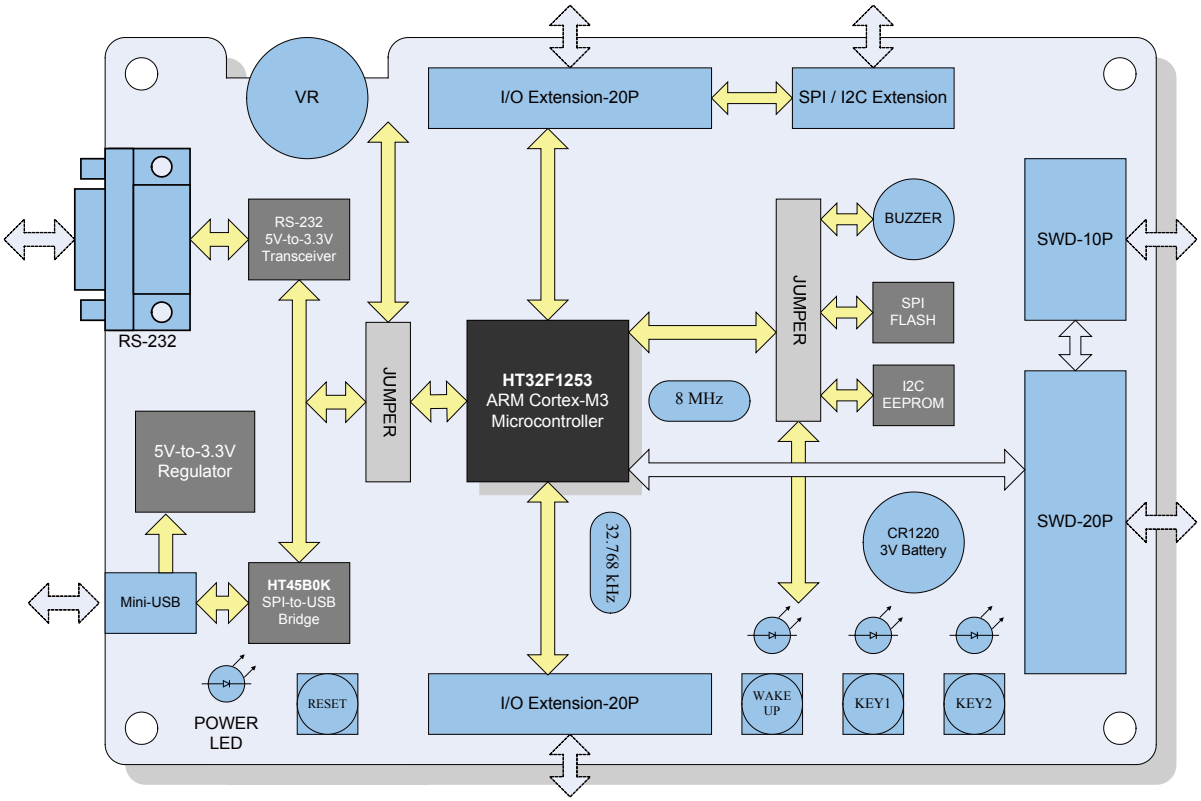


Figure 2. HT32F125x Development Board Block Diagram

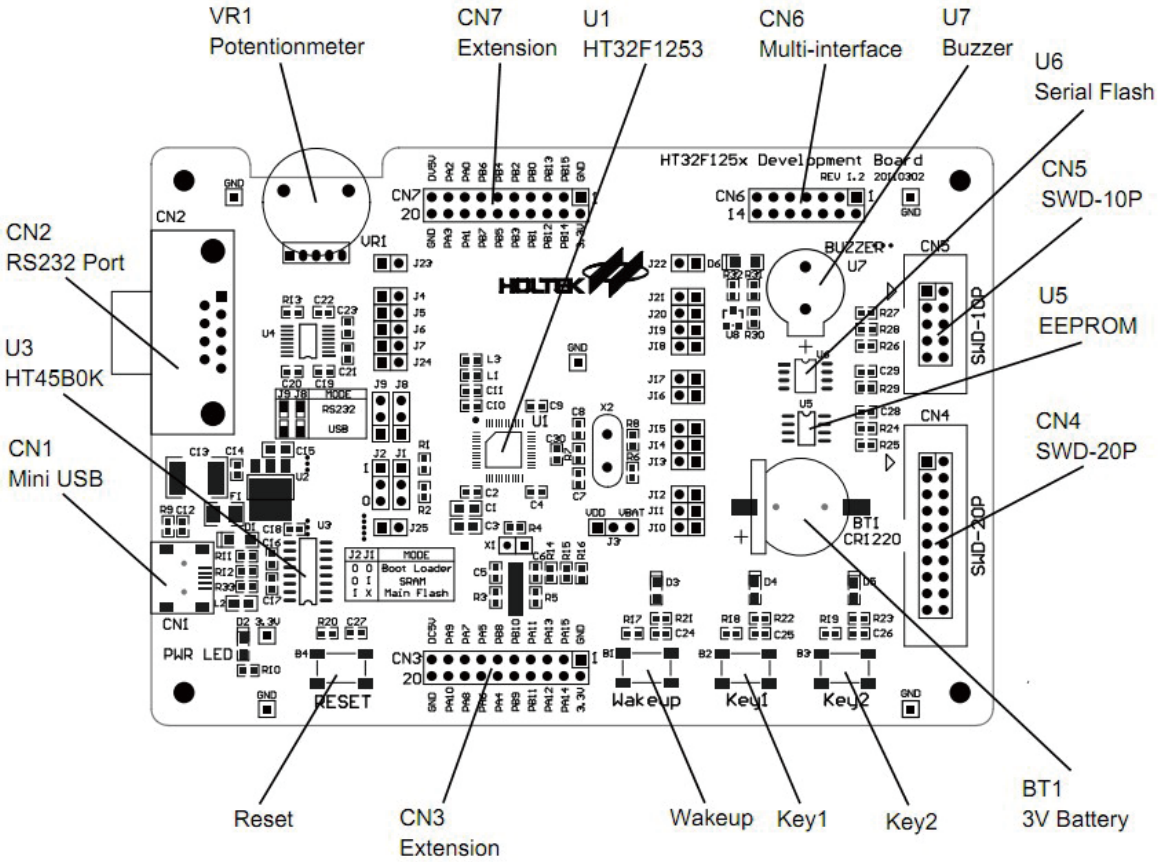


Figure 3. HT32F125x Development Board PCB layout

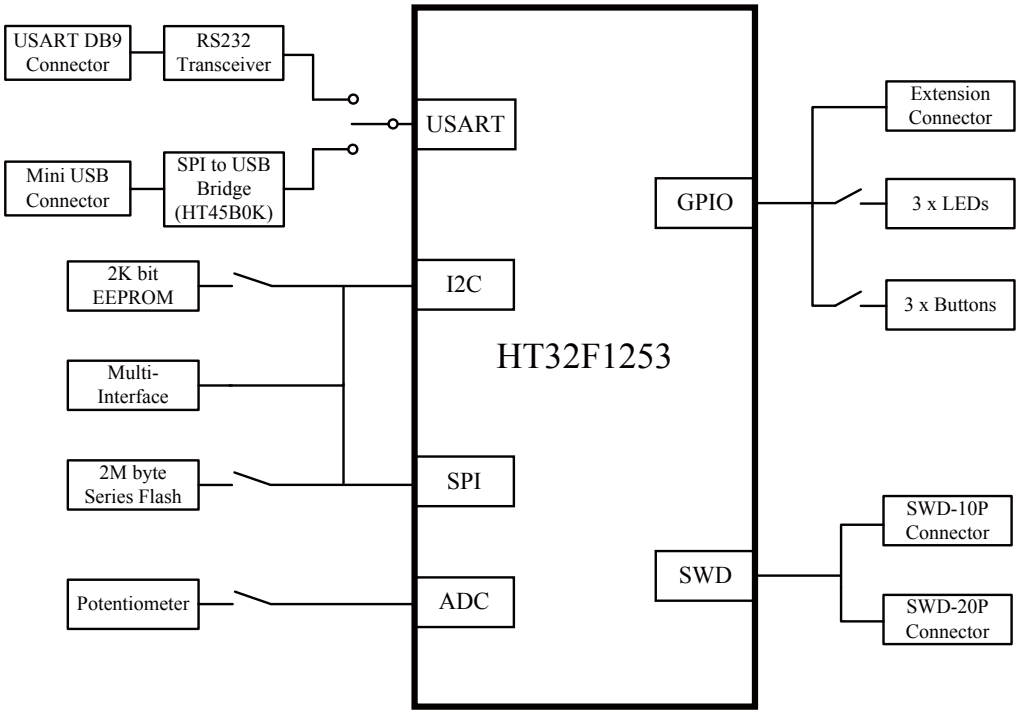


Figure 4. HT32F125x Development Board Peripheral Block Diagram

RS232 & USB Mode

As the RS232 and USB ports share the same USART interface on the HT32F125x development board, only one of them can be chosen. This is implemented using the J8 & J9 jumpers. For example, to use the USB interface, the J8 and J9 jumpers must first select the USB mode and J4~7 & J24 must also be connected. Additionally, the USART to SPI mode must be configured by software to control the USB bridge (HT45B0K) to implement a USB function.

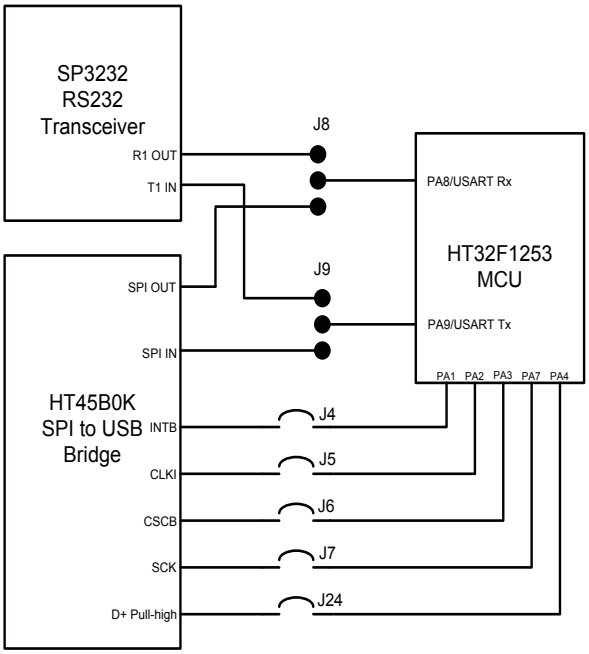
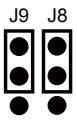
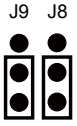


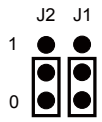
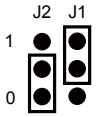
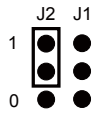
Figure 5. RS232 / USB Jumpers Switch Block Diagram

Table 1. USART Mode Jumpers

Jumper	Description
J9 & J8	RS232 mode setting. J9 J8 
	USB mode setting - here J4~J7 and J24 also need to be connected for the USB bridge (HT45B0K) control. J9 J8 

Boot Option

Table 2. Boot Jumpers

Jumper	Description
J1 & J2	Boot loader mode  Boot from the embedded boot loader.
	SRAM mode  Boot from the embedded SRAM
	Main flash mode  Boot from the embedded main flash. BOOT0 (J1) don't care and BOOT1 (J2) = 1 (default setting)

V_{BAT} Option

Table 3. V_{BAT} Jumpers

Jumper	Description
J3	V_{BAT} pin is connected to the 3.3V power - default setting
	V_{BAT} pin is connected to the 3V CR1220 battery

SWD-20P Port CN4

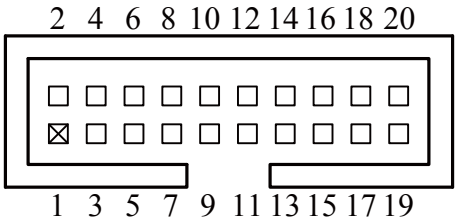


Figure 6. SWD-20P Port CN4

Table 4. SWD-20P Connector CN4

Pin#	Description	Pin#	Description
1	3.3V	2	3.3V
3	NC	4	GND
5	NC	6	GND
7	SWDIO	8	GND
9	SWCLK	10	GND
11	NC	12	GND
13	TRACESWO	14	GND
15	Reset#	16	GND
17	NC	18	GND
19	NC	20	GND

SWD-10P Port CN5

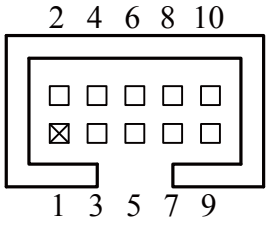


Figure 7. SWD-10P Port CN5

Table 5. SWD-10P Connector CN5

Pin#	Description	Pin#	Description
1	3.3V	2	SWDIO
3	GND	4	SWCLK
5	GND	6	TRACESWO
7	NC	8	NC
9	GND	10	Reset

RS232 CN2

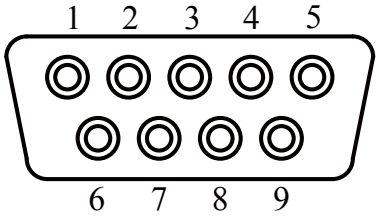


Figure 8. RS232 Connector CN2

Table 6. RS232 Connector CN2

Pin#	Description	Pin#	Description
1	Connected to PIN4	6	Connected to PIN1
2	USART_Rx (PA8)	7	Connected to PIN8
3	USART_Tx (PA9)	8	Connected to PIN7
4	Connected to PIN6	9	NC
5	GND		

Multi-Interface CN6

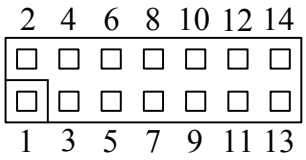


Figure 9. Multi-Interface CN6

Table 7. Multi-Interface Connector CN6

Pin#	Description	Pin#	Description
1	3.3V	2	GND
3	PB3	4	NC
5	PB5	6	PB6
7	PB15	8	PB14
9	PB13	10	PA11
11	PA12	12	PB4
13	GND	14	DC5V

Extension Connectors CN3 & CN7

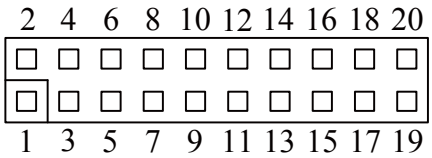


Figure 10. Extension Connectors CN3 & CN7

Table 8. Extension Connector CN3

Pin#	Description	Pin#	Description
1	GND	2	3.3V
3	PA15	4	PA14
5	PA13	6	PA12
7	PA11	8	PB11
9	PB10	10	PB9
11	PB8	12	PA4
13	PA5	14	PA6
15	PA7	16	PA8
17	PA9	18	PA10
19	DC5V	20	GND

Table 9. Extension Connector CN7

Pin#	Description	Pin#	Description
1	GND	2	3.3V
3	PB15	4	PB14
5	PB13	6	PB12
7	PB0	8	PB1
9	PB2	10	PB3
11	PB4	12	PB5
13	PB6	14	PB7
15	PA0	16	PA1
17	PA2	18	PA3
19	DC5V	20	GND

Mini USB Type B Connector CN1

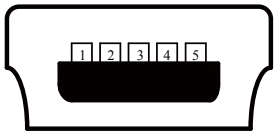


Figure 11. Mini USB type B Connector CN1

Table 10. Mini USB type B Connector CN1

Pin#	Description	Pin#	Description
1	USB_5V	2	D-
3	D+	4	NC
5	GND	6	USB shielding GND

3 Component Jumpers

The component jumpers are used to connect up the components. For example, J13 will be connected to LED D3 to allow the LED to be switched on and off by the application program.

Table 11. Component Jumpers

Jumper#	PIN of HT32F1253	Description
J1	PA9	Select boot0 input 0 (low) or 1 (high)
J2	PA10	Select boot1 input 0 (low) or 1 (high)
J3	VBAT	Select VBAT power source (VDD or Battery)
J4	PA1	Connected to HT45B0k INTB
J5	PA2	Connected to HT45B0k CLKI
J6	PA3	Connected to HT45B0k SCSB
J7	PA7	Connected to HT45B0k SCK
J8	PA8	Switch between RS232 or USB Mode
J9	PA9	Switch between RS232 or USB Mode
J10	PB10	Connected to wakeup button
J11	PB11	Connected to key1 button
J12	PA10	Connected to key2 button
J13	PA5	Connected to LED (D3)
J14	PA6	Connected to LED (D4)
J15	PB12	Connected to LED (D5)
J16	PA11	Connected to HT24LC16 SCL
J17	PA12	Connected to HT24LC16 SDA
J18	PB14	Connected to SST25VF016B SO
J19	PB15	Connected to SST25VF016B SI
J20	PB13	Connected to SST25VF016B SCLK
J21	PB7	Connected to SST25VF016B CS
J22	PB2	Connected to buzzer
J23	PA0	Connected to potentiometer
J24	PA4	USB D+ Pull-high control
J25	VDD33	MCU 3.3V power input

4 Schematics

This section shows the complete circuit of the HT32F125x development board:

- Figure 12 includes the MCU, Extension Connectors, Jumpers, SWD-10P Connector, SWD-20P Connector and Multi-interface.
- Figure 13 includes the USB and RS232 interfaces, Jumpers, Potentiometer, LEDs, Flash, EEPROM, Buttons and Buzzer.

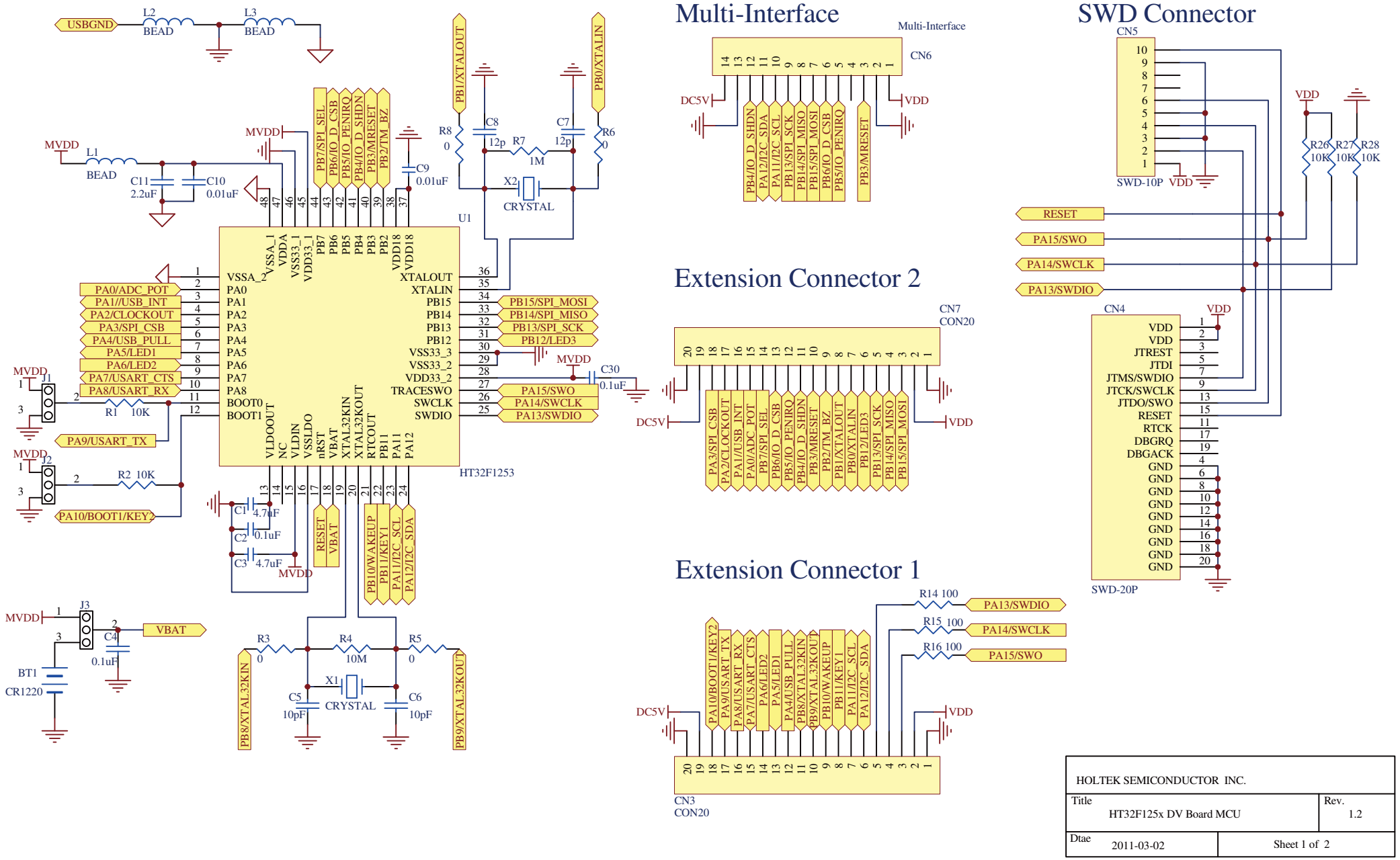


Figure 12. MCU, Extension Connectors, Jumpers, SWD and Multi-interface

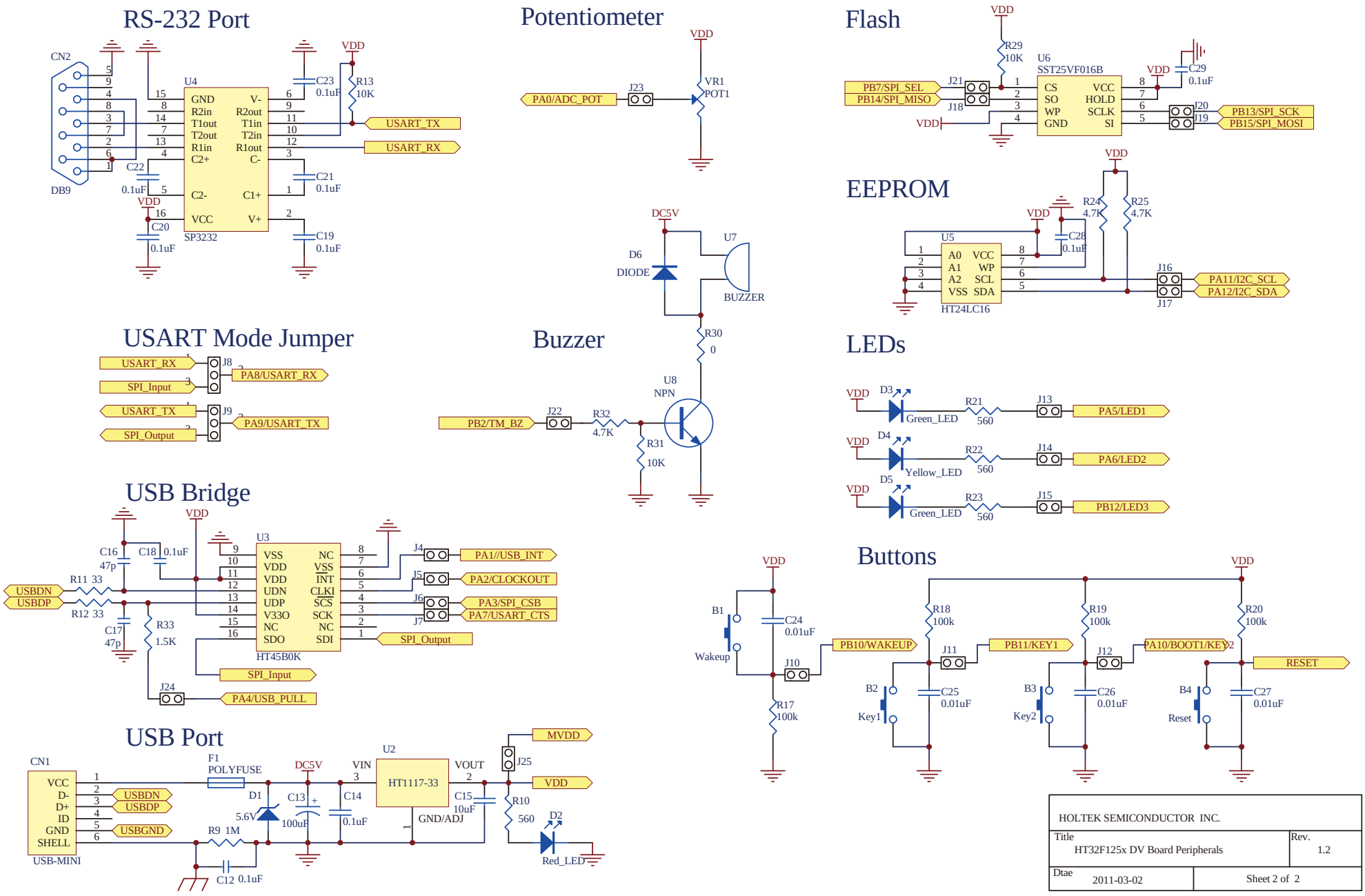


Figure 13. USB, RS232, Jumpers, Potentiometer, LEDs, Flash, EEPROM, Buttons and Buzzer

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